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STUDIES IN CONNECTION WITH THE SELECTION OF A SATISFACTORY CULTURE MEDIUM FOR BACTERIAL AIR SAMPLING [1]

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INTRODUCTION

During the past decade interest has been revived and marked progress attained in the study of air-borne infections. The revival of interest in this field has been stimulated by the development of the air centrifuge (*1*) as a new practical method for the quantitative bacteriologic examination of the air, and by the recognition of the role played by droplets, droplet nuclei (*2, 3, 4*), and dust (*5, 6, 7, 8*) in transmission of air-borne infection (*5*). Extensive studies have been conducted on the three principal phases of the problem of air-borne infection: (1) Establishment of an index of bacterial air pollution (*5, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18*); (2) methods of air sampling, i. e., detection of bacterial air pollution (*20, 21*); and (3) physical and chemical methods of rendering air noninfectious, i. e., control of air-borne infection (*5, 19*). The results presented herein are part of a series of studies now in progress on all three phases of the problem.

In the detection of air pollution most attention has been given to the development of sampling devices (*20, 21*) and comparison of their efficiency without adequate consideration of the factors involved in the selection of satisfactory culture media for this purpose. The culture medium employed for bacterial air sampling should be especially favorable to the growth of the micro-organisms which are of particular significance in the atmospheres to be investigated. In sampling the air of food and beverage manufacturing plants, for example, the culture medium employed should be selective for yeasts, molds, or other resistant spoilage types of micro-organisms economically important to that industry.

Since respiratory tract infections constitute the predominant type of air-borne diseases, it would seem logical to select a culture medium

[1] From the Industrial Hygiene Research Laboratory, National Institute of Health. Presented before the Laboratory Section of the American Public Health Association at the Seventy-third Annual Meeting in New York, N. Y., Oct. 5, 1944.

capable of demonstrating the greatest diversity and incidence of micro-organisms from the respiratory tract. However, the majority of the workers in this field have employed only so-called nutrient agar or meat infusion agar with or without the addition of blood. Occasionally the use of selective media has been reported for this purpose (*9*, *16*, *17*, *18*, *23*, *24*, *25*, *26*, *29*), or for the isolation of *Streptococcus salivarius* from other sources (*22*, *27*, *28*, *30*), but, except for a few instances, formulae for the exact composition of these media were not given. Unless the exact composition of a medium, as well as the exact designation of each ingredient, particularly the peptones, is known, that medium cannot be used by other investigators hoping to obtain comparable results or to duplicate their own results.

It is felt therefore that the type of culture medium employed in bacterial air sampling is of fundamental importance and that it should meet the following requirements: (1) Possess selectivity for fastidious micro-organisms from the respiratory tract, (2) inhibit nonsignificant saprophytes which interfere with accurate bacterial counts, and (3) have a standard composition, thus enabling other workers to employ identical culture media under similar conditions.

The experimental studies included in this report were undertaken in a search for such a medium as well as to obtain more information on some of the factors which influence the selection of the medium.

EXPERIMENTAL

Bacterial air pollution may be evaluated in two ways: (1) On the basis of total numbers of bacteria present and (2) on the basis of the presence of one type of organism considered to be an index of pollution, much as the coliform group of bacteria is used as an index of water pollution.

The method may consist in collecting air samples directly on a solid culture medium by means of an impingement device (*21*), or with an atomizing device (*21*) by means of which air is introduced into a liquid substrate which is later plated on a solid medium or is redistributed by the dilution method into a series of sterile tubes for incubation. In the latter procedure, the incidence of a given type of micro-organism is determined on the basis of most probable numbers followed by confirmation of colonies on a selective solid medium (*16*). While this latter method is entirely valid and has certain advantages from the standpoint of accuracy, it is not so well adapted for field work or for quick results. Since the use of solid media has a wider field of application, this type of media only will be considered in this study.

Gordon (*9*) in 1902–03 proposed the hypothesis and offered supportive evidence that air contamination by humans consists primarily of micro-organisms prevalent in the upper respiratory tract, namely, streptococci, and particularly *Str. salivarius*. He suggested the

utilization of this organism as an index of human air pollution. Gordon's work has been corroborated by subsequent workers (*10*, *11*, *12*, *13*, *14*, *15*, *16*, *17*, *18*).

Comparison of media for the isolation and growth of streptococci and other air-borne organisms.—Since a comparatively limited number of studies have been reported on the development of selective culture media for the detection of nasopharyngeal contamination of the air, it was decided to preface this investigation with a comparison of media recommended or known to be adapted to this purpose.

Twelve media used for air sampling by previous investigators (*17*, *23*, *24*, *25*, *26*, *31*), or known to be particularly favorable to the growth of streptococci (*28*) were examined by plating suitable dilutions of test organisms as follows:

Sixteen- to eighteen-hour neopeptone broth [2] cultures of *Str. salivarius* No. 7961 or No. 7996, American Type Culture Collection, *Streptococcus pyogenes* and *Streptococcus viridans*, National Institute of Health, *Staphylococcus albus*, United States Food and Drug Administration, and a sporulating bacillus isolated from the air were diluted 1 : 100 in sterile physiological saline and a loopful of this dilution was plated in duplicate on each test medium plus 5 percent sterile defibrinated sheep blood. Plates were incubated 40 hours at 37° C. and examined at 24 and 40 hours for number and size of colonies.

The media tested were:

Tryptose agar (31).—Bacto-tryptose, 20 gm.; NaCl, 5 gm.; bacto-dextrose, 1 gm.; bacto-agar, 25 gm.; distilled water, 1,000 ml.; pH, 6.9. This medium is recommended for the cultivation of pathogenic organisms, especially *Brucella* and the streptococci.

Tryptose agar without dextrose.—Omit dextrose from above formula.

Beef heart hormone agar.—Beef heart infusion, 1,000 ml. (from 500 gm. beef heart per liter); neopeptone, Difco, 10 gm.; NaCl, 5 gm.; bacto-agar, 25 gm.; pH 7.4–7.5. This medium was used by Torrey and Lake (*17*) to recover streptococci from air.

Maltose agar.—Neopeptone, Difco, 10 gm.; NaCl, 8.5 gm.; glucose, 0.5 gm.; bacto-agar, 25 gm.; maltose, 10 gm.; distilled water, 1,000 ml.; pH 7.6. This medium was recommended by Simmons and Wilson (*26*) as a presumptive test medium for β-hemolytic streptococci.

Garrod's medium (23, 24, 25).—Bacto-beef extract, 3 gm.; bacto-peptone, 1 gm.; potassium tellurite, 0.5 gm.; crystal violet, 0.002 gm.; bacto-agar, 25 gm.; distilled water, 1,000 ml.; pH 7.4. This is an approximation of the medium which Garrod called "ox-heart extract peptone agar." He added 5 percent horse blood to the medium.

Garrod's medium with salicin (23).—Same formula as above but with 10 gm. of salicin added per liter.

Veal infusion agar.—Veal infusion, 1,000 ml. (from 500 gm. ground lean veal); bacto-peptone, 10 gm.; NaCl, 5 gm.; bacto-agar, 25 gm.; pH 7.3. This is a medium commonly used as a blood agar base for isolating streptococci from milk.

Purple lactose agar.—Beef infusion, 1,000 ml. (from 500 gm. beef per liter); bacto-peptone, 5 gm.; bacto-lactose, 10 gm.; bacto-agar, 25 gm.; bacto-bromcresol purple, 0.025 gm.; pH 6.8. This medium was tested to see whether it was suitable for the growth of acid-producing streptococci.

[2] Meat infusion, 1,000 ml. from 500 gm. meat; neopeptone, Difco, 10 gm.; NaCl, 5 gm.; pH, 7.4±.

Nutrient agar, 2.5 percent (31).—Bacto-beef extract, 3 gm.; bacto-peptone, 5 gm.; NaCl, 8.0 gm.; bacto-agar, 25 gm.; distilled water, 1,000 ml.; pH 6.4.

Meat infusion agar.—Meat infusion, 1,000 ml. (from 500 gm. meat); bacto-peptone, 5.0 gm.; NaCl, 8.5 gm.; bacto-agar, 18 gm.; pH 6.8. Ordinarily beef would be employed but for this medium only horse meat was available. It proved to be satisfactory.

Rose and Georgi's medium (28).—Proteose peptone, Difco, 5 gm.; bacto-yeast extract, 5 gm.; bacto-beef extract, 3 gm.; glucose, CP, 10 gm.; sodium azide (1 percent aqueous), 20 ml.; distilled water 1,000 ml.; pH 7.2. The sodium azide was made up separately, sterilized, and added to the medium just before use. For these studies the medium was modified by the addition of 18 gm. bacto-agar per liter. This medium was recommended for recovery of *Str. salivarius* from eating utensils.

Proteose extract agar.—Proteose peptone No. 3, Difco, 20 gm.; bacto-beef extract, 3 gm.; bacto-yeast extract, 3 gm.; malt extract, Difco, 3 gm.; bacto-dextrose, 5 gm.; NaCl, 8.5 gm.; bacto-agar, 25 gm.; pH 6.8. This is a modification of a medium submitted to this laboratory for experimental testing by the Difco Laboratories, Inc., Detroit, Mich. It was labelled "Anaerobe Medium with Dextrose" and, according to the Difco Laboratories, it had been developed for the growth of fastidious anaerobic micro-organisms to which it was particularly well adapted. It also had been found to be an excellent medium for strict and facultative aerobes.

The original "anaerobe medium with dextrose," containing only 0.1 gm. of agar per liter and no sodium chloride, was found to support an excellent growth of streptococci. It was modified by the addition of more agar and of NaCl to prevent hemolysis and employed throughout these studies under the name of "proteose extract agar."

The concentration of agar in the media for these preliminary experiments was usually 2.5 percent, the amount recommended for use with the Wells air centrifuge (*1*).

Streptococcus hemolyticus, Str. viridans, Str. salivarius, Staph. albus, and the sporulating bacillus grew best on proteose extract agar, beef heart hormone agar, tryptose dextrose agar, and tryptose agar. The other media tested were less favorable to the growth of the streptococci than these four.

The maltose agar (*26*), despite its strong recommendation for the growth of streptococci and the fact that it appeared to inhibit the spreading growth of the sporulate, a property which has given considerable trouble in air-sampling studies, was distinctly less favorable to the growth of the streptococci. Rose and Georgi's medium (*28*), which was tested only with *Str. salivarius,* could not compare, either in number or size of colonies produced, with the proteose extract agar or tryptose dextrose agar.

The addition of 0.5 ml. of sterile defibrinated sheep blood to every 10 ml. of medium tended to improve the growth of the streptococci on all media except the purple lactose agar to which blood was never added.

The addition of 0.002 gm. (1 : 500,000) of crystal violet (bacto-crystal violet DC-1, actual dye content 92 percent, CI No. 681, Lot

No. 291853) to each liter of media Nos. 1 to 7 and 12, before sterilization, materially reduced the growth of all the organisms tested.

For further comparative studies proteose extract agar, tryptose dextrose agar, and meat infusion agar were selected. The first two are obtainable commercially, and their exact composition and ability to grow fastidious micro-organisms is known. The meat infusion agar, although of indefinite composition, most nearly approximated the "nutrient agar" reported as used by so many previous investigators.

Influence of the concentration of agar employed in media for air sampling.—The concentrations of agar employed in air-sampling media have ranged from 1.5 to 2.5 percent. However, 2.0 to 2.5 percent have been employed by most workers for this purpose. Apparently the primary reasons for using higher concentrations of agar than usual for bacteriological plating media are to obtain a more stable medium capable of withstanding the impingement action from a rapidly flowing air stream, and to provide a more dehydrated medium which would retard the development of sporulating aerobic spreaders.

Since increasing the concentrations of agar in a plating medium results in its dehydration to a degree that may render it inhibitory to the development of fastidious types of micro-organisms, it seemed advisable to ascertain the concentration of agar which would provide a medium that would be stable when used with all types of impingement air-sampling devices and at the same time would offer suitable conditions for the development of maximum numbers and types of bacteria.

The first series of experiments was designed to ascertain the minimum concentration of agar necessary to produce a stable medium, and particularly a medium for use with the impingement sampling devices. Proteose extract agar was employed as the basic medium throughout these experiments, the only variable being the concentration of agar. Experimental lots of the medium were made up to contain 1.5, 1.8, 2.0, and 2.5 percent agar.

The devices used for collecting air samples are of two types: impingment devices (*21*) in which air-borne micro-organisms are impinged upon the surface of a solid culture medium and atomizing devices in which air is finely atomized into a liquid medium. The primary advantage of employing an impingement device lies in the fact that samples may be immediately incubated and the colony count determined without further manipulation of the sample. The air samples taken in the liquid medium of the atomizing devices are subsequently plated out or redistributed in replicate sterile tubes by the dilution method.

The impingement devices used included the air centrifuge (*1*), bottle device (*32*), slit device (*20*), funnel device (*33*), sieve device

(*34*), and exposed agar plate. The bubbler flask (*35*) was the only atomizing type of device used. Air samples were collected simultaneously where possible by the seven devices, each impingement device sampling on the culture medium containing one concentration of agar. The bubbler flask device contained proteose extract enrichment broth [3] into which the air samples were atomized and subsequently this broth-sampling medium was plated in quintuplicate on the basic medium containing each percentage concentration of agar.

All samples were incubated at 37° C. for 48 hours. Some of the air-centrifuge sample tubes were incubated horizontally, whereas others were incubated vertically, in order to provide the most stringent conditions for testing the stability of the medium. Since it was found impossible, under the conditions of the experiment, to collect identical or uniform air samples with each device, only the results bearing on the stability of the medium are presented. These results are summarized in table 1.

TABLE 1.—*Stability of culture medium containing various concentrations of agar used with different air-sampling devices*

Air-sampling device or method	Concentrations of agar in medium											
	1.5 percent			1.8 percent			2.0 percent			2.5 percent		
	Total samples tested	Total samples stable	Total samples unstable	Total samples tested	Total samples stable	Total samples unstable	Total samples tested	Total samples stable	Total samples unstable	Total samples tested	Total samples stable	Total samples unstable
Wells air centrifuge:												
Tubes incubated vertically	5	2	3	6	3	3	5	2	3	5	5	0
Tubes incubated horizontally	11	8	3	6	6	0	11	11	0	11	10	1
Bottle device	12	11	1	6	6	0	12	12	0	12	12	0
Slit device	25	25	0	12	12	0	24	24	0	24	24	0
Funnel device	25	25	0	6	6	0	24	24	0	24	24	0
Sieve device	33	33	0	189	189	0	33	33	0	33	33	0
Exposed petri plate method	51	51	0	72	72	0	48	48	0	49	49	0
Bubbler flask device	[1] 56	[2] 55	[3] 1	[4] 167	[4] 167	0	[1] 56	[1] 56	0	[1] 56	[1] 56	0

[1] 280 plates. [2] 278 plates. [3] 2 plates. [4] 2,650 plates.

The total air samples collected with each device, on each concentration of agar, the total samples in which the medium remained stable during sampling and incubation, and the total samples in which the medium was of inadequate stability are shown in the table. The stability of the medium was considered to be inadequate if any degree of slippage or physical disintegration occurred during the sampling process or incubation period.

It was found that a medium with an agar concentration of 1.5 percent possessed adequate stability for use with all devices except the air centrifuge.

[3] Same formula as proteose extract agar with agar omitted.

The medium containing 1.8 percent agar possessed adequate stability for use with all sampling devices. Slippage or disintegration of this agar occurred only in the air centrifuge tubes incubated in a vertical position.

Aerobic sporulating spreaders frequently obscured counts in air samples regardless of the concentration of the agar employed in the medium.

From the results obtained it was concluded that a solid medium containing an agar concentration of 1.8 percent possesses adequate stability for use with all types of air sampling devices and that higher concentrations of agar are not justified from the standpoint of spreader control, especially since there are other more promising methods for accomplishing this purpose.

A second series of experiments was carried out in order to determine the effect of the concentration of agar on the growth and development of bacteria contained in air samples. The bubbler flask air-sampling device (*35*) was employed in these studies. This device (fig. 1) consists of a 250-ml. suction flask, closed with a one-hole rubber stopper through which passes a glass tube open at one end

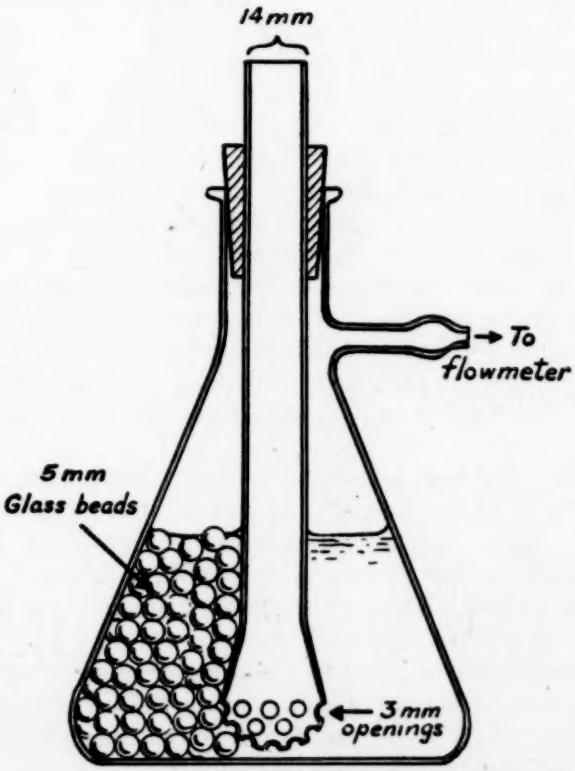


FIGURE 1.—Bubbler flask air-sampling device.

and with a pear-shaped perforated bubbler bulb at the other. The pear-shaped end reaches the bottom of the flask and is surrounded by 200 gm. of solid glass beads (5 mm.) and 50 ml. of enrichment broth.[4] Five drops of olive oil are added to each flask before sterilization in order to reduce foaming. When air samples are collected, the air enters through the perforated bulb and is atomized into the liquid at the approximate rate of 1.0 cu. ft. per minute.

Forty-eight air samples were collected with this device in a room occupied by experimental animals. Each sample flask was thoroughly agitated and then inoculated in quintuplicate into plates of proteose extract agar containing 1.5, 1.8, 2.0, and 2.5 percent agar, respectively, i.e., five plates of medium containing each concentration of agar were inoculated with 1.0 ml. of broth from each sample. All plates were incubated at 37° C. for 48 hours. The colony counts per cubic foot of air were determined by totaling the counts obtained on the five plates containing each concentration of agar, multiplying the total count (five plates) by a corrected factor of approximately 10, and dividing the result by the volume of air sampled (5 or 10 cu. ft.). The corrected factor was obtained by determining the weight of broth (1.0 gm.=1.0 ml.) lost from the flask during sterilization and sampling and dividing the remaining volume of broth by 5, i.e., the number of milliliters plated in each concentration of agar. The highest counts were obtained on the greatest number of samples with media containing 1.5 and 1.8 percent agar, respectively.

A graphic comparison of the bacterial counts per 1.0 cu. ft. of air obtained from the 48 air samples on media containing 1.8, 2.0, and 2.5 percent agar is shown in figure 2. The counts obtained with media containing 1.5 percent agar are omitted from the graph because this concentration of agar does not produce a medium of adequate stability for all air-sampling purposes. The bacterial counts obtained on the 1.8 percent agar are arranged in descending order of magnitude to provide a smooth curve and the counts obtained with the 2.0 and 2.5 percent agar for the corresponding samples are plotted on the same ordinates.

For purposes of further analysis only the data obtained with 1.8 and 2.5 percent agar are considered. It will be noted that there is considerable fluctuation of the corresponding counts obtained with the 2 concentrations on the various samples with a tendency for the 1.8 percent agar to give higher counts more frequently (34 times in 48 samples) which is more than might be expected from chance (24 ± 7).[5] It will be noted, however, that in a number of samples the counts are very close to each other and in each instance the 1.8 percent agar gave slightly higher counts, giving an advantage that seems unwarranted in view of wide fluctuations in the other counts.

[4] The enrichment broth is of the same composition as proteose extract agar with agar omitted.

[5] ($24 \pm 2\sqrt{48 . \frac{1}{2} . \frac{1}{2}}$ or 7.)

In terms of percentage, the 2.5 percent agar gave, on the average, counts that were 5.4 percent less than the counts on the 1.8 percent agar. The wide fluctuations of the counts around each other, however, give a large standard deviation around this mean percentage difference (5.4 percent ± 20.5), indicating that there is little assurance that one medium will give higher counts than the other for any single sample taken under the same conditions in which these samples were taken. The mean difference of 5.4 percent in the counts on the two media also is not significant (5.4 percent ± 3.0). Under the conditions of this experiment, it may be said that the 1.8 percent agar tends to give higher counts than the 2.5 percent agar, although the data were insufficient to prove this.

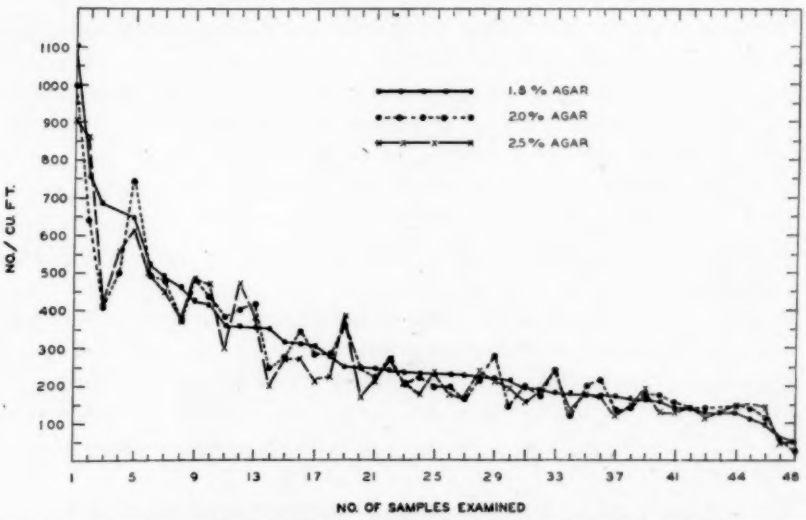


FIGURE 2.—Comparison of air-sample counts on proteose extract agar containing various percentages of agar.

It is concluded that a concentration of 1.8 percent agar is stable for use with all types of air-sampling devices. This concentration gives as high total counts as 1.5 percent agar and possibly higher counts than 2.5 percent agar. In view of the present shortage of agar, the use of a concentration above 1.8 percent would not be justified.

Comparison of proteose extract agar, tryptose agar, and meat infusion agar for general air sampling.—Proteose extract agar and the tryptose agar were selected for these studies because of their standard composition and their suitability for bacteria from the respiratory tract; and the meat infusion agar because it was believed that although of indefinite composition it more nearly approximated the "nutrient infusion agar" reported as used by so many previous investigators.

These media were prepared according to the formulae already given except that they were modified to contain 0.85 percent sodium chloride and 1.8 percent agar.

Sixty air samples were collected with the bubbler flask device in a room occupied by experimental animals, where bacterial air counts had been found to be extremely high during cleaning and feeding operations, and low during periods of quiet. Five or ten cubic feet of air were collected for each sample. Physiological saline (8.5 gm. NaCl per liter) was substituted for the enrichment broth in the sampling flasks for these studies. After the collection of samples each flask was immediately shaken to a consistent degree. One milliliter of sample fluid was inoculated into each of 15 plates and 5 of the inoculated plates were poured with each medium. All plates were incubated at 37° C. for 48 hours after the pouring and hardening of the medium. The number of bacteria per cubic foot of air was then determined, as previously described in this report.

The data, when treated statistically by converting the differences in the counts obtained on meat infusion and proteose extract agar to percentages of the corresponding meat infusion agar count, showed that although meat infusion gave higher counts more frequently (meat infusion 35 times, proteose extract 23 times, alike 2 times) the average percentage difference in counts was slightly in favor of the proteose extract agar (1.05 percent). Because of the wide fluctuations in the counts on the 2 media for the different samples, this is obviously not significant.

In a similar comparison of meat infusion agar with tryptose agar it was found that the counts on tryptose agar were, on the average, 8.2 percent lower than the counts on meat infusion agar. Here again, however, the individual counts on the two media showed wide variability (8.2 percent $\pm$39.9) and the mean percentage difference is not significant (8.2 percent $\pm$5.2).

A comparison of tryptose agar and proteose agar showed that the former gave, on the average, counts 4.6 percent lower than the latter. Here again wide fluctuation of individual counts gave a large standard deviation (4.6 percent $\pm$31.3) and the mean difference of 4.6 percent is not significant (4.6 percent $\pm$4.1).

From these calculations it cannot be concluded that any one of the three media has any advantage over the other two for general air sampling.

Another series of studies was undertaken in order to obtain data which were more adapted to statistical analysis. Nine air samples, of 5.0 cubic feet each, were collected with the bubbler flask device (fig. 1) in the same room as before. These 9 samples were thoroughly agitated and combined into 1 composite sample. One-milliliter quantities of fluid from the thoroughly shaken composite sample were inoculated into each of 30 petri dishes. Three sets of 10 of these plates were immediately poured with proteose extract agar, tryptose agar, and meat infusion agar, respectively, The elapsed time be-

tween inoculation and pouring of plates did not exceed 10 minutes. The composite sample was again agitated and the inoculation and plating processes repeated until 100 plates had been inoculated and poured with each type of medium. All plates were incubated at 37° C. for 48 hours after which the incidence of viable micro-organisms developing on each plate was determined.

In the comparison of counts from the composite air sample obtained on proteose extract agar, tryptose agar, and meat infusion agar only the first 30 counts were used since the counts tended to decrease gradually in subsequent platings. After discarding unsatisfactory counts there remained 23, 28, and 27 counts for the 3 media, in the order given above, which were satisfactory for statistical interpretation. The proteose extract agar gave a mean count of 8.9 ± 2.7; the tryptose agar a mean count of 12.4 ± 4.0; and the meat infusion agar a mean count of 14.3 ± 4.1. The difference in the mean counts between the proteose extract agar and tryptose agar are significant (3.5 ± 0.94) as is the difference between the proteose extract agar and the meat infusion agar (5.4 ± 0.97). However, the difference between the meat infusion agar and the tryptose agar (1.9 ± 1.08) is not significant.

It will be noted that although the comparison of these three media on the basis of counts from replicate plates taken from a single composite air sample showed meat infusion agar and tryptose agar to give significantly higher mean counts than proteose extract agar, none of the three showed any statistically significant advantage in total bacterial counts on serial air samples. The reason for this is not clear but there are a number of possible explanations. First, in the serial air samples, collected over a period of months, only 5 plates were inoculated from each sample, whereas in the case of the large composite air sample, collected during one day, replicate plates (100) were inoculated. Hence, in the latter case the large number of plates used lessens the influence of marked fluctuations in counts which occur at times and allows slight actual differences in the efficiency of the different media to become apparent. Secondly, there is a fluctuation in the types of organisms obtained from serial air samples and these types may differ in their ability to grow on the various media.

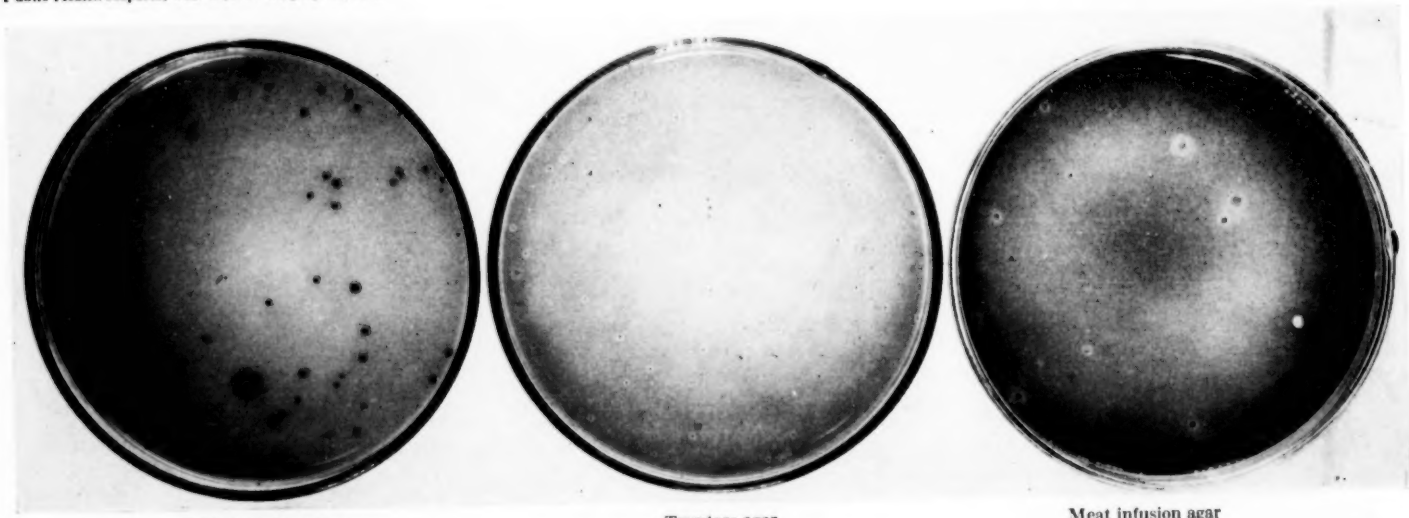
Since in the serial air sample the proteose extract agar showed no tendency to give lower counts than the other two media, it is quite possible that if repeated composite air samples could be examined in replicate, first one and then another of the three media might show higher or lower counts, depending on the types of micro-organisms and their relative proportions of the total organisms in different samples.

Comparison of proteose extract agar, tryptose agar, and meat infusion agar for the recovery of Streptococcus salivarius *from artificially contaminated atmospheres.*—A specially constructed sheet-metal room

(7′ x 10′ x 8′) was employed for these studies. There were two doors to this room, one leading to the outside, the other to a similar room, which was used as an entry room. An inset 34″ x 33″ x 35″ at the bottom and to one side of the room provided outlets for the introduction of culture, and for the collection of air samples from the outside of the room. The room was sprayed with hot water and the floors, walls, and ceilings thoroughly washed the day before each experiment. Sterilization was accomplished by the burning of three 15 w., 18″ General Electric ultraviolet germicidal lights during the night before the experiment and not less than 4 hours before it began. Wet- and dry-bulb thermometers were suspended in front of a window in the wall of the room, thus permitting temperature readings for relative humidity determinations at the beginning of each sampling period. Fifty milliliters of a 24-hour tryptose broth culture were atomized into the test room for 1 hour. • Air circulation was maintained throughout each experiment by means of an electric fan placed on the floor of the room. The culture mist was allowed to settle for 30 minutes, at the end of which time sampling was begun. Air samples were collected with the bubbler flask device (fig. 1) at 20-minute intervals throughout a 3.5-hour period. Each air sample of 5 cu. ft. was collected at a rate of 1 cu. ft. per minute. The rate of air flow was measured by means of a closed manometer placed between the sampling device and the air pump.

Each sample was thoroughly agitated as soon as collected and plated in quintuplicate (1.0 ml. of inoculum per plate) on each of three types of media. Six percent of sterile defibrinated sheep blood was added to each medium before the plates were poured. Following incubation of the inoculated plates at 37° C. for 48 hours, the incidence and size of the colonies of *Str. salivarius* developing on each type of medium were determined. For the entire series of tests proteose extract agar gave higher counts on 18.75 percent more samples than tryptose agar and 40.6 percent more samples than meat infusion agar. The mean of the counts for 32 samples was slightly higher for tryptose agar than for proteose extract agar. However, this was entirely due to 2 counts in the series which were extremely high on tryptose agar. The incidence and colonial appearance of *Str. salivarius* in plate cultures on each of the 3 media inoculated with aliquot portions of the same sample are shown in figure 3. While tryptose blood agar occasionally showed higher counts of this organism than proteose extract blood agar, the latter medium invariably developed larger and more distinctive colonies surrounded by a green or brown zone containing a precipitate which was characteristic of the organism. The colonies developing on tryptose blood agar were pin-point in size and would be very hard to distinguish in mixed culture.

PLATE I



Proteose extract agar | Tryptose agar | Meat infusion agar

FIGURE 3.—Incidence and colonial appearance of *Streptococcus salivarius* on proteose extract, tryptose, and meat infusion agar, inoculated with aliquot portions of the same sample.

A representative test from the series just described is given in table 2. Two important facts which are readily apparent from a study of this table and figure 3 are: (1) Proteose extract agar is markedly superior to either tryptose agar or meat infusion agar for the recovery of *Str. salivarius* from an artificially contaminated atmosphere, and (2) there is a rapid disappearance of the organism from the air following its introduction. Disappearance curves for *Str. salivarius*, based on the data submitted in table 2, are shown in figure 4. The number

TABLE 2. *Comparison of proteose extract agar, tryptose agar, and meat infusion agar for recovery of* Streptococcus salivarius *from artificially contaminated atmosphere*

Sample number	Time sampled (p. m.)	Relative humidity (percent)	Bubbler flask device Air-sample counts—number per cubic foot		
			Proteose extract agar	Tryptose agar	Meat infusion agar
17	1:35	66.0	251.9	195.0	63.7
18	1:50	66.0	97.0	90.0	12.0
19	2:10	66.0	22.0	15.0	2.0
20	2:30	66.0	4.0	4.0	0.0
21	2:50	66.0	1.0	0.0	1.0
22	3:10	66.0	1.0	0.0	0.0
23	3:30	66.0	2.0	0.0	0.0
24	3:50	66.0	0.0	0.0	0.0
Average (mean)			47.4	38.0	8.6

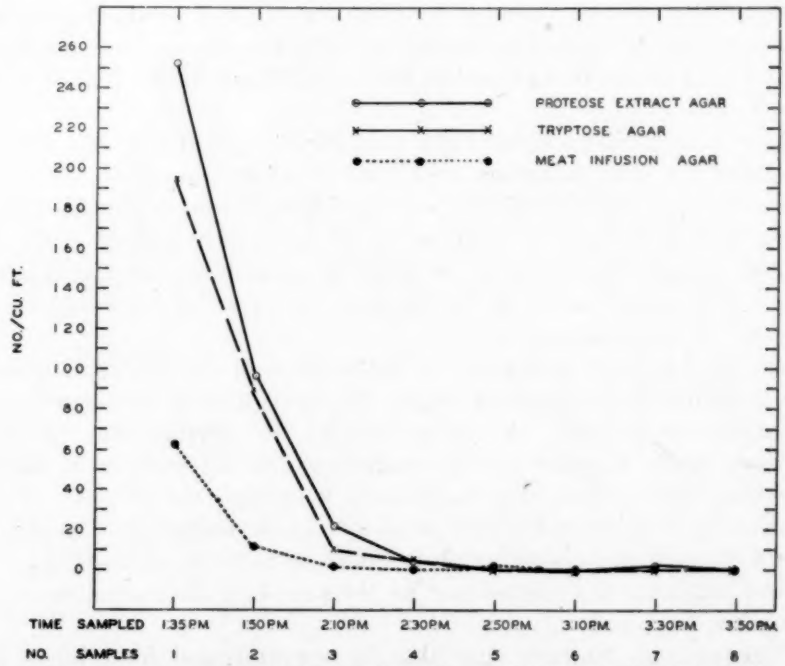


FIGURE 4.—Disappearance of *Streptococcus salivarius* from artificially contaminated atmosphere.

of viable bacteria recovered per cubic foot of air sampled is plotted on the ordinate and the time of sampling and the number of samples collected are given on the abscissa. It will be noted that the number of *Str. salivarius* recoverable from the air had been reduced almost to zero within 1.5 to 2.0 hours following atomization of the culture into the experimental chamber. The data presented in figure 4 are described as disappearance curves because adequate information is not yet available to indicate whether the disappearance of the organisms from the air is due to settling or to the death of the organisms. However, a limited number of laboratory multiple plating experiments indicate that the rapid disappearance of the organisms is due to their death. If subsequent studies substantiate this theory an explanation is provided for the low incidence of *Str. salivarius* recovered from the atmosphere in congested habitations such as sleeping quarters and schools. This would indicate that some other micro-organisms of respiratory habitat may provide a more satisfactory index of air contamination.

DISCUSSION

There can be little doubt of the heightened importance of air-borne infections at this time, in view of the aggregation of military populations and war workers in limited areas under conditions which favor the spread of such infections.

Despite numerous valuable contributions to this problem in recent years there is as yet neither a standard of air sanitation nor a routine analytical procedure such as has been established in the field of water sanitation.

Microbiological methods offer a quick easy means of determining bacterial air contamination and thus of evaluating the efficacy of physical and chemical methods for air disinfection. The usefulness of such microbiological methods would be greatly enhanced by the establishment of a standardized sampling procedure and of a standard of air sanitation, based on the incidence of types of micro-organisms indicative of contamination.

An approach has been made to the problem of establishing standard methods for the analysis of air by the development of a number of air-sampling devices. A comparison of the performance of these devices under a given set of conditions and recognition of factors affecting such performance has already been reported (*20, 21*). Comparatively little work has been done on the development of media for use with such devices although it would seem to be obvious that the culture medium is as important as the sampling device for detecting air-borne bacteria.

The proteose extract agar that is recommended for trial in air-sampling studies is believed to be superior to the other media that

have been used for this purpose. It appears to give a total count comparable to that obtained on ordinary meat infusion agar. In addition, both plating and air-sampling experiments show that it is superior for the growth of several strains of streptococci, organisms which have been suggested as indices of air pollution.

Proteose extract agar is also very favorable to the growth of other fastidious micro-organisms. A limited number of plating experiments showed that strains of *Neisseria intracellularis* and *Hemophilus influenzae* developed easily detectable colonies in proteose extract blood agar. Both these organisms have been carried in laboratory culture for over a year in proteose extract medium containing only 0.1 percent agar. In the course of other air-sampling studies on the atmospheres of human habitations, diphtheroids, unclassified Gram-negative and Gram-positive diplococci and the ever-present staphylococci were frequently recovered. It is therefore believed that this medium is favorable to fastidious micro-organisms of the upper respiratory tract.

Other factors which may necessitate still further modification of this medium are now under investigation. These include optimum pH, temperature of incubation and oxygen requirements of bacteria significant in air sampling, incorporation into the medium of chemical agents inhibitory to nonsignificant sporulating spreaders, and comparison with other media for ability to recover a diversity of types of micro-organisms from air.

The findings with regard to the inhibitory action of crystal violet on streptoccoci confirm those of Rose and Georgi (*36*). The incorporation of any inhibitory agent into an air-sampling medium should be attended by careful tests with low inocula of test organisms before it is recommended as routine procedure.

Str. salivarius, because of its relatively high incidence in the human respiratory tract, has been suggested as a satisfactory index of air contamination. However, our studies indicate that this organism tends to disappear very soon from an artificially contaminated atmosphere, apparently because of its rapid death rate. This fact may explain the failure of previous investigators to recover *Str. salivarius* in large numbers from the air of occupied areas. *Str. salivarius* is also difficult to distinguish from the ubiquitous staphylococcus species. If these disadvantages cannot be overcome, it is suggested that attention should be given to a study of other bacteria as suitable indexes of infectious air contamination.

SUMMARY

The requirements of a satisfactory standardized culture medium for air sampling are outlined as follows: (1) It should possess selectivity for fastidious micro-organisms from the respiratory tract; (2) it should

inhibit nonsignificant saprophytes which interfere with accurate bacterial counts; and (3) it should have a standard composition, thus enabling other workers to use an identical culture medium under similar conditions.

Twelve different media were compared for growing streptococci, staphylococci, and a sporulating bacillus in an attempt to find one that would meet these requirements.

The addition of 1 : 500,000 crystal violet to each medium materially reduced the growth of all of the organisms tested, including the streptococci.

Proteose extract agar was found to be satisfactory for the growth of staphylococci and sporulates, and superior to all of the other media tested for the growth of streptococci.

A medium containing an agar concentration of 1.8 percent was found to possess adequate stability for use with impingement air-sampling devices without inhibiting bacterial growth.

Proteose extract agar, tryptose agar, and meat infusion agar were compared for general air-sampling purposes and for the recovery of *Str. salivarius* from the air. In general air sampling, higher counts were obtained on the greatest percentage of samples with meat infusion agar. However, there was no statistical significance between the counts obtained with the three media in serial air samples. Proteose extract agar was markedly superior to either of the other two media for the recovery of streptococci from air. This medium (proteose peptone, No. 3, Difco, 20.0 gm.; bacto-beef extract, 3.0 gm.; bacto-yeast extract, 3.0 gm.; bacto-malt extract, 3.0 gm.; bacto-dextrose, 5.0 gm.; sodium chloride, 8.5 gm.; bacto-agar, 18.0 gm.; distilled water, 1.0 liter; final pH, 6.8±) is suggested as a basic medium of standard composition, which may be employed for air-sampling purposes.

It was demonstrated that there is a rapid disappearance of *Str. salivarius* from an artificially contaminated atmosphere, and it is suggested that this rapid disappearance is primarily due to the death of the organism.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

May 20–June 16, 1945

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State for each week are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4 weeks ended June 16, 1945, the number reported for the corresponding period in 1944, and the median number for the years 1940–44.

DISEASES ABOVE MEDIAN PREVALENCE

Poliomyelitis.—The number of cases of poliomyelitis rose from 136 during the preceding 4-week period to 302 for the 4 weeks ended June 16. Of the total cases, Texas reported 120, New York 28, California 25, South Carolina 17, Alabama 14, Virginia 11, and North Carolina, Georgia, and Utah 8 cases each. Since the beginning of the year there have been 198 cases reported in Texas, the largest number being from the following 6 counties in the extreme southeastern part of the State: Harris 46 (city of Houston 31), Hidalgo 17, Galveston and Hueces 12 each, and Bexar and Willacy

9 each; the remaining cases were widely scattered over the State. In 1944 and 1943 Texas reported 65 and 108 cases, respectively, for this same period. For the country as a whole for this same period there have been 999 cases reported, as compared with 657 for the corresponding period in 1944 and a median of 646 cases for the preceding 5 years (1940–44).

An increase of this disease is normally expected at this season of the year, and while the number of cases is relatively high, the rate of increase during the 4-week period was about normal. Five of the nine geographic sections reported increases over the normal seasonal incidence; in three sections the incidence was about normal, and in one section alone (West North Central) the number of cases was below the median.

Meningococcus meningitis.—For the current 4-week period there were 639 cases of this disease reported, as compared with 1,167 for the corresponding weeks in 1944 and a 5-year median of 288 cases. Each section of the country showed a decline from the 1944 figure for these same weeks, but in relation to the median seasonal expectancy the incidence was still high in each section. While the number of cases for this period is only about one-half of the number reported for the corresponding periods in 1944 and 1943, it will probably be some time before it reaches the low level of preceding years.

Diphtheria.—For the 4 weeks ended June 16 there were 810 cases of diphtheria reported, as compared with 676 for the corresponding period in 1944 and a preceding 5-year median of 703 cases. An increase in the number of cases over 1944 was reported from all sections except the Mountain and Pacific, the increases ranging from about 10 percent in the West South Central section to 85 percent in the West North Central section. Compared with recent years the number of cases for the country as a whole was about 15 percent above the 1940–44 median, and was higher than the median in each section of the country except the East North Central and Mountain sections.

Influenza.—The influenza incidence decreased about 35 percent during the 4 weeks ended June 16. The number of cases (3,479) was, however, about 20 percent above the incidence during the corresponding period in 1944. The 1940–44 median was represented by the 1944 figure (2,854 cases). An increase over the preceding 5-year median of approximately 40 percent was reported from the New England, West North Central, and West South Central, but in all other sections the incidence was relatively low.

Scarlet fever.—For this disease the incidence continued relatively high, 15,512 cases being reported for the current 4 weeks, as against 14,210 in 1944 and a preceding 5-year median of 10,121 cases. Only 4 of the geographic sections reported an increase over the 1944 figures for this period, but each of the 9 sections reported an increase over the 5-year median.

DISEASES BELOW MEDIAN PREVALENCE

Measles.—The number of cases of measles was considerably below the normal incidence for this season. The reports showed a total of 19,349 cases for the 4 weeks ended June 16, as compared with 59,394 for the same 4 weeks in 1944 and a 1940–44 median of approximately 63,000 cases. The situation was favorable in each section of the country. For the country as a whole, as well as for each geographic section except the Pacific, the current incidence was the lowest for this period since 1938.

Smallpox.—The incidence of smallpox (25 cases) during the current 4 weeks stood at the level of the corresponding period in 1944, but it was only about 25 percent of the 1940–44 median. In the West North Central section the number of cases (14) was above the seasonal

Number of reported cases of 9 communicable diseases in the United States during the 4-week period May 20–June 16, 1945, the number for the corresponding period in 1944, and the median number of cases reported for the corresponding period, 1940–44

Division	Current period	1944	5-year median	Current period	1944	5-year median	Current period	1944	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	810	676	703	3,479	2,854	2,854	19,349	59,394	62,904
New England	21	14	14	81	55	11	1,786	6,170	6,994
Middle Atlantic	103	90	94	21	15	27	3,155	8,342	10,115
East North Central	125	85	143	148	82	301	3,309	11,186	11,186
West North Central	83	45	46	48	14	35	873	3,114	4,496
South Atlantic	134	104	108	745	760	958	607	6,547	4,621
East South Central	45	33	42	112	198	167	354	919	1,265
West South Central	154	143	106	1,905	1,386	1,386	1,990	7,200	4,314
Mountain	50	54	54	346	229	329	982	1,839	2,789
Pacific	95	108	81	73	115	216	6,293	14,077	5,040
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	639	1,167	288	302	197	179	15,512	14,210	10,123
New England	36	70	29	5	5	5	1,720	1,415	974
Middle Atlantic	145	282	103	41	24	13	4,525	3,213	3,213
East North Central	142	286	21	16	13	9	4,234	4,376	3,041
West North Central	64	90	17	1	5	5	1,101	1,258	700
South Atlantic	88	120	56	50	43	15	1,294	1,065	529
East South Central	49	93	22	21	29	10	292	278	278
West South Central	56	87	20	128	43	16	353	362	172
Mountain	11	16	5	8	6	6	419	639	197
Pacific	48	123	25	32	29	29	1,574	1,604	589
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	25	25	105	323	411	457	10,203	7,443	15,016
New England	0	0	0	17	23	23	1,154	488	1,040
Middle Atlantic	0	0	0	35	36	62	1,959	978	2,585
East North Central	3	5	48	22	35	42	1,100	1,061	3,115
West North Central	14	4	9	8	23	29	255	418	655
South Atlantic	2	0	2	61	86	106	1,792	1,676	1,789
East South Central	0	7	8	67	53	47	453	518	632
West South Central	2	3	19	70	86	101	1,252	1,110	1,581
Mountain	3	5	5	19	23	15	359	717	717
Pacific	1	1	4	24	46	32	1,879	477	1,826

[1] Mississippi and New York excluded; New York City included.
[2] Mississippi excluded.

expectancy, while in other sections the incidence was the same or lower than the preceding 5-year median.

Typhoid and paratyphoid fever.—The incidence of this disease was also relatively low, the number of cases (323) reported being about 70 percent of the 5-year (1940–44) median. The East South Central and Mountain sections reported a few more cases than normally occur during this period, but in all other sections the incidence was below the seasonal median. For the country as a whole the number of cases was the lowest recorded for this period in the 17 years for which these data are available.

Whooping cough.—There were 10,203 cases of whooping cough reported for the 4 weeks ended June 16, as compared with 7,443 for the corresponding period in 1944. The 1940–44 median for this period was approximately 15,000 cases. The New England, Middle Atlantic, and Pacific sections reported significant increases over last year's figures for the corresponding weeks, but only one section, the New England, reported an increase over the 5-year median. In the South Atlantic and Pacific regions the incidence was about normal, while in other sections the numbers of cases fell below the normal expectancy.

MORTALITY, ALL CAUSES

For the 4 weeks ended June 16 there were 35,440 deaths from all causes reported by 93 large cities to the Bureau of the Census. The average number reported for the corresponding period in the years 1942–44 was 34,042 deaths. The number of deaths for each week of the current 4 weeks was higher than the 3-year average, the increases ranging from 1.1 percent in the second week to 8 percent in the last week of the period. The average increase for the 4 weeks was 4.4 percent.

INCIDENCE OF HOSPITALIZATION, MAY 1945

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover hospital service plans scattered throughout the country, mostly in large cities.

Item	May	
	1944	1945
1. Number of plans supplying data	71	81
2. Number of persons eligible for hospital care	13,492,069	17,737,698
3. Number of persons admitted for hospital care	120,375	165,379
4. Incidence per 1,000 persons, annual rate, during current month (daily rate × 365)	105.3	109.7
5. Incidence per 1,000 persons, annual rate, for the 12 months ended May 31	104.6	104.2
6. Number of plans reporting on hospital days	19	25
7. Days of hospital care per case discharged during month [1]	6.73	8.07

[1] Days include entire stay of patient in hospital-whether at full pay or at a discount.

DEATHS DURING WEEK ENDED JUNE 16, 1945

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce

	Week ended June 16, 1945	Corresponding week, 1944
Data for 92 large cities of the United States:		
Total deaths	8,807	8,267
Average for 3 prior years	8,152	
Total deaths, first 24 weeks of year	224,692	229,646
Deaths under 1 year of age	568	635
Average for 3 prior years	596	
Deaths under 1 year of age, first 24 weeks of year	14,699	14,983
Data from industrial insurance companies:		
Policies in force	67,368,516	66,618,073
Number of death claims	14,203	12,459
Death claims per 1,000 policies in force, annual rate	11.0	9.8
Death claims per 1,000 policies, first 24 weeks of year, annual rate	10.9	10.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JUNE 23, 1945

Summary

A total of 116 cases of poliomyelitis was reported for the current week, as compared with 96 last week, 125 for the corresponding week last year, and a 5-year median of 69. The current week and the week ended May 12 are the only weeks this year in which a smaller number of cases was reported than for the corresponding week last year. Only 5 States, as follows (last week's figures in parentheses), reported more than 5 cases each: Texas 39 (37), New York 16 (10), Ohio 10 (1), California 9 (5), Alabama 8 (8). The total number of cases reported to date this year is 1,115, as compared with 782 and 894, respectively, for the corresponding periods of 1944 and 1943, and a 5-year median of 697. Since March 17, when the lowest weekly incidence to date this year (24 cases) was reported, 718 cases have been reported, 365 of which, or slightly more than 50 percent, were reported in 3 States, as follows (last year's corresponding figures in parentheses): Texas 221 (41), New York 94 (37), California 50 (71). Too much significance, however, should not be attached to the comparatively larger number of cases reported this year in some States. In New York for example, a large number of the cases reported during the current year are stated to have had onset in 1944 and were not reported at the time.

The incidence of meningococcus meningitis declined. A total of 122 cases was reported, as compared with 133 last week and a 5-year median of 112. The total to date is 5,275, as compared with 11,660 for the same period last year and a 5-year median of 1,967.

Six cases of psittacosis were reported during the week—1 in New York and 5 in Pennsylvania.

A total of 9,111 deaths was recorded during the week in 93 large cities of the United States, as compared with 8,849 for the preceding week, a 3-year (1942–44) average of 8,532, and 8,557 for the corresponding week last year. The cumulative figure is 234,564, as compared with 238,970 for the same period of 1944.

Telegraphic morbidity reports from State health officers for the week ended June 23, 1945, and comparison with corresponding week of 1944 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	June 23, 1945	June 24, 1944		June 23, 1945	June 24, 1944		June 23, 1945	June 24, 1944		June 23, 1945	June 24, 1944	
NEW ENGLAND												
Maine	2	0	0				1	69	111	0	0	0
New Hampshire	0	1	0				0	17	7	1	0	0
Vermont	0	0	0				59	19	47	0	0	0
Massachusetts	1	1	3				330	548	759	3	9	9
Rhode Island	0	0	0				18	5	97	1	1	1
Connecticut	2	1	1	1		1	59	138	200	2	1	1
MIDDLE ATLANTIC												
New York	11	14	13	[1] 4	(1)	[1] 2	170	638	996	14	27	17
New Jersey	2	2	4	4	1	2	64	432	933	3	11	3
Pennsylvania	9	8	8		1		769	244	463	10	15	6
EAST NORTH CENTRAL												
Ohio	1	2	5	2	1	3	45	93	182	3	15	4
Indiana	8	0	2	4	2	2	22	30	63	1	3	3
Illinois	1	7	17	4		6	335	134	217	17	17	1
Michigan [1]	17	9	4		1	1	261	345	508	6	10	0
Wisconsin	3	1	1	4	8	9	100	823	954	2	4	1
WEST NORTH CENTRAL												
Minnesota	2	9	1				6	117	117	0	2	1
Iowa	2	0	1				39	81	126	1	0	0
Missouri	4	2	1	8			14	39	65	5	14	1
North Dakota	1	1	1	10		2	3	13	13	0	0	0
South Dakota	0	3	0				5	5	5	0	0	0
Nebraska	0	2	1				48	39	39	0	0	0
Kansas	3	0	1	1	2	1	40	63	126	2	2	0
SOUTH ATLANTIC												
Delaware	0	0	0				3	1	2	0	0	0
Maryland [1]	8	5	3	2	4	2	11	74	74	3	1	3
District of Columbia	0	0	0				4	46	46	0	3	2
Virginia	6	3	3	35	66	22	22	115	115	1	9	8
West Virginia	1	1	2		3	3	1	68	23	2	0	1
North Carolina	2	10	4				14	184	120	0	8	1
South Carolina	8	7	1	66	62	81	10	80	40	0	3	1
Georgia	4	2	2	1	3	12	6	29	42	0	2	2
Florida	0	2	2	1	6	6	3	64	50	0	4	1
EAST SOUTH CENTRAL												
Kentucky	1	2	3	1	1	1	17	16	42	3	3	1
Tennessee	2	2	3	8	8	9	28	21	50	2	3	0
Alabama	6	2	2	14	15	12	1	48	72	5	9	2
Mississippi [2]	8	1	1							1	4	1
WEST SOUTH CENTRAL												
Arkansas	4	3	3	1	8	8	33	63	23	3	1	1
Louisiana	3	2	3	1	1	2	60	42	13	[3] 0	7	1
Oklahoma	1	1	1	15	4	7	20	82	67	1	1	0
Texas	22	21	23	390	162	162	260	642	303	10	5	2
MOUNTAIN												
Montana	0	0	1	3	1		5	18	49	0	1	0
Idaho	1	0	0				3	5	9	1	2	1
Wyoming	0	0	0			2	12	25	18	0	2	0
Colorado	1	5	5	18	12	12	13	50	64	0	2	0
New Mexico	2	3	1		5	1	6	17	17	1	1	0
Arizona	1	0	2	38	26	26	3	35	35	0	0	0
Utah [2]	0	0	0	2	1	1	183	43	98	2	0	0
Nevada	0	4	0	2			0	9	1	0	0	0
PACIFIC												
Washington	8	6	2	4	1	1	180	123	130	3	4	1
Oregon	0	4	2	1	6	3	26	54	59	0	0	3
California	26	19	15	10	9	56	944	1,710	693	13	11	11
Total	184	168	168	655	420	451	4,256	7,556	8,695	122	217	112
25 weeks	6,533	5,419	6,178	65,802	334,931	166,266	87,795	570,515	499,064	[3] 5,275	11,660	1,967

[1] New York City only. [2] Period ended earlier than Saturday.
[3] Correction: Louisiana, week ended June 2, meningococcus meningitis 7 cases (instead of 5).

Telegraphic morbidity reports from State health officers for the week ended June 23, 1945, and comparison with corresponding week of 1944, and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [4]		
	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	June 23, 1945	June 24, 1944		June 23, 1945	June 24, 1944		June 23, 1945	June 24, 1944		June 23, 1945	June 24, 1944	
NEW ENGLAND												
Maine	0	0	0	27	16	8	0	0	0	0	1	0
New Hampshire	0	0	0	10	1	1	0	0	0	0	0	0
Vermont	0	0	0	4	6	3	0	0	0	0	0	0
Massachusetts	0	0	0	179	164	139	0	0	0	0	3	3
Rhode Island	0	0	0	5	7	5	0	0	0	0	0	0
Connecticut	3	1	1	16	25	29	0	0	0	0	1	1
MIDDLE ATLANTIC												
New York	16	9	3	427	219	219	0	0	0	6	2	7
New Jersey	2	1	1	77	71	71	0	0	0	3	1	1
Pennsylvania	1	2	1	294	141	141	0	0	0	2	2	4
EAST NORTH CENTRAL												
Ohio	10	7	1	197	97	101	0	0	0	1	3	5
Indiana	0	1	0	31	20	20	1	0	0	1	0	2
Illinois	2	5	3	129	75	87	0	0	0	2	4	4
Michigan [3]	1	2	2	167	158	148	0	0	0	5	1	3
Wisconsin	0	0	0	86	104	67	0	3	1	0	1	1
WEST NORTH CENTRAL												
Minnesota	0	4	1	64	52	23	0	0	0	0	0	0
Iowa	1	0	0	20	27	15	2	0	1	0	0	0
Missouri	1	0	1	23	22	14	0	0	0	2	2	1
North Dakota	0	0	0	3	10	6	0	0	0	4	0	0
South Dakota	0	0	0	1	6	6	0	0	0	0	0	0
Nebraska	0	0	0	19	13	9	0	0	0	0	0	0
Kansas	2	1	0	43	9	16	0	0	0	0	3	1
SOUTH ATLANTIC												
Delaware	0	0	0	1	2	4	0	0	0	0	0	1
Maryland [3]	1	0	0	47	58	27	0	0	0	0	2	2
District of Columbia	0	0	0	18	17	6	0	0	0	1	0	0
Virginia	0	4	1	27	23	7	0	0	0	4	2	3
West Virginia	0	0	0	22	26	15	0	0	0	2	2	3
North Carolina	0	41	1	27	11	11	0	0	0	1	6	5
South Carolina	5	2	1	2	12	2	0	0	0	2	4	4
Georgia	5	1	1	11	7	7	0	0	0	11	5	13
Florida	2	1	1	2	6	1	0	0	0	0	2	2
EAST SOUTH CENTRAL												
Kentucky	0	17	1	22	15	17	0	0	3	5	3	3
Tennessee	2	0	0	9	19	15	0	0	0	3	2	5
Alabama	8	3	2	6	3	3	0	0	0	5	2	2
Mississippi [3]	1	2	2	12	5	3	0	0	0	3	6	4
WEST SOUTH CENTRAL												
Arkansas	0	2	2	7	0	2	0	0	0	7	2	6
Louisiana	0	7	2	12	4	4	0	0	0	4	6	9
Oklahoma	3	2	1	9	3	3	1	0	0	2	3	4
Texas	39	4	3	39	23	23	1	1	0	15	16	18
MOUNTAIN												
Montana	0	0	0	6	13	9	0	0	0	1	1	1
Idaho	0	0	0	4	6	6	0	0	0	1	0	1
Wyoming	0	0	0	6	4	4	0	0	0	0	0	0
Colorado	2	2	0	21	31	17	0	0	0	0	2	2
New Mexico	0	0	0	7	7	4	0	0	0	2	1	1
Arizona	0	0	1	12	12	3	0	0	0	0	4	3
Utah [3]	0	1	0	10	16	7	0	0	0	1	0	0
Nevada	0	0	0	3	0	0	0	0	0	0	0	0
PACIFIC												
Washington	0	0	0	39	71	23	0	0	0	2	0	2
Oregon	0	0	0	11	35	7	0	0	1	1	1	1
California	9	3	7	234	164	112	0	0	1	1	8	6
Total	116	125	69	2,448	1,836	1,836	5	4	12	100	104	150
25 weeks	1,115	782	697	126,110	139,920	91,042	240	263	568	1,607	2,004	2,212

[3] Period ended earlier than Saturday.
[4] Including paratyphoid fever reported separately, as follows: New York 4; Michigan 1; Virginia 1; South Carolina 1; Texas 1.

Telegraphic morbidity reports from State health officers for the week ended June 23, 1945, and comparison with corresponding week of 1944 and 5-year median—Con.

Division and State	Whooping cough			Week ended June 23, 1945							
	Week ended—		Median 1940–44	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever	Undulant fever
	June 23, 1945	June 24, 1944		Amebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine	46	14	14	0	0	0	0	0	0	0	1
New Hampshire	0	0	2	0	0	0	0	0	0	0	0
Vermont	16	18	18	0	0	0	0	0	0	0	1
Massachusetts	75	58	116	1	0	0	0	0	0	0	0
Rhode Island	19	3	16	0	1	0	0	0	0	0	0
Connecticut	39	24	49	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC											
New York	177	110	283	4	5	0	1	0	0	0	4
New Jersey	157	46	94	0	0	0	0	1	0	0	4
Pennsylvania	197	80	250	0	0	0	0	1	0	0	4
EAST NORTH CENTRAL											
Ohio	107	83	173	2	0	0	1	0	0	0	3
Indiana	10	12	24	0	0	0	0	1	1	0	0
Illinois	60	71	102	0	2	0	2	0	0	0	12
Michigan [2]	56	64	173	3	0	0	0	0	0	0	6
Wisconsin	30	62	123	0	0	0	0	0	1	0	16
WEST NORTH CENTRAL											
Minnesota	12	25	39	2	0	0	0	0	0	0	5
Iowa	1	8	28	0	0	0	0	0	0	0	8
Missouri	15	20	20	0	0	0	0	0	2	0	0
North Dakota	2	13	13	0	0	0	0	0	0	0	0
South Dakota	0	19	2	0	0	0	0	0	0	0	6
Nebraska	3	34	11	0	0	0	0	0	0	0	0
Kansas	44	29	56	0	0	0	1	0	0	0	9
SOUTH ATLANTIC											
Delaware	1	0	2	0	0	0	0	1	0	0	0
Maryland [2]	82	90	75	0	0	0	0	5	0	0	1
District of Columbia	8	1	10	0	0	0	0	0	0	0	0
Virginia	46	111	103	0	0	250	0	1	2	0	1
West Virginia	11	7	33	0	0	0	0	0	0	0	0
North Carolina	221	184	155	0	0	0	0	1	0	4	0
South Carolina	53	41	41	2	50	0	0	0	0	3	0
Georgia	31	13	23	1	1	0	0	1	0	15	3
Florida	15	10	10	0	0	0	0	0	0	10	0
EAST SOUTH CENTRAL											
Kentucky	45	103	75	0	0	0	0	1	0	0	0
Tennessee	24	34	34	0	0	0	0	1	0	1	1
Alabama	23	48	40	0	0	0	0	0	0	16	4
Mississippi [2]	----	----	----	0	0	0	0	0	1	3	0
WEST SOUTH CENTRAL											
Arkansas	3	16	31	0	1	0	0	0	3	0	1
Louisiana	6	1	14	[3]2	1	0	0	0	0	16	4
Oklahoma	22	1	16	0	1	0	0	0	2	0	1
Texas	243	215	359	15	415	50	2	0	0	38	11
MOUNTAIN											
Montana	7	9	15	0	0	0	0	0	0	0	0
Idaho	0	9	9	0	0	0	0	0	0	0	0
Wyoming	2	15	5	0	0	0	0	0	0	0	0
Colorado	35	21	30	0	2	0	0	0	0	0	9
New Mexico	16	4	16	0	2	0	0	0	0	0	0
Arizona	23	13	13	0	0	36	0	0	0	0	2
Utah [2]	37	76	76	0	0	0	1	0	2	0	3
Nevada	0	0	0	0	0	1	0	0	0	0	0
PACIFIC											
Washington	10	10	53	0	0	0	0	0	0	0	0
Oregon	13	9	30	3	0	0	0	0	0	0	5
California	321	82	282	4	7	0	0	0	0	1	7
Total	2,364	1,916	3,475	40	488	337	8	14	14	107	132
Same week, 1944	1,916	----	----	54	548	304	9	36	12	94	73
Average, 1942–44	3,253	----	----	62	451	240	10	[4]31	22	[4]58	----
25 weeks, 1945	62,419	----	----	[3]793	10,981	3,097	174	127	390	1,471	2,309
1944	45,334	----	----	676	8,033	2,426	274	146	280	1,292	1,557
Average, 1942–44	80,860	----	[4]95,277	694	5,533	1,847	255	[4]163	410	[4]954	----

[2] Period ended earlier than Saturday.
[3] Correction: Louisiana, week ended June 2, amebic dysentery 12 cases (instead of 2).
[4] 5-year median, 1940–44.

Leprosy: Texas 3; Washington 1. *Psittacosis:* New York 1; Pennsylvania 5.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 16, 1945

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	0	0	1	0	1	0	0	4
New Hampshire:												
Concord	0	0	------	0	3	0	0	0	3	0	0	0
Vermont:												
Barre	0	0	------	0	25	0	0	0	1	0	0	0
Massachusetts:												
Boston	1	0	------	0	118	3	11	0	75	0	1	31
Fall River	0	0	------	0	0	0	1	0	3	0	0	1
Springfield	0	1	------	0	1	0	1	0	19	0	0	2
Worcester	0	0	------	0	47	0	6	0	5	0	0	0
Rhode Island:												
Providence	0	0	------	0	2	0	1	0	10	0	0	14
Connecticut:												
Bridgeport	0	0	------	0	0	0	1	1	0	0	0	0
Hartford	0	0	------	0	17	0	0	0	6	0	0	0
New Haven	0	0	1	0	0	0	0	0	2	0	0	3
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	1	2	3	3	14	0	0	0
New York	15	1	1	0	86	9	48	3	221	0	1	83
Rochester	0	0	------	0	53	0	1	0	17	0	0	5
Syracuse	0	0	------	0	0	0	2	0	1	0	0	29
New Jersey:												
Camden	0	0	------	0	5	0	1	0	1	0	0	0
Newark	0	0	1	0	6	0	2	0	8	0	0	11
Trenton	0	0	------	0	5	0	2	0	1	0	0	2
Pennsylvania:												
Philadelphia	3	0	1	1	407	1	15	2	53	0	1	87
Pittsburgh	1	0	2	2	7	1	3	1	58	0	0	20
Reading	0	0	------	0	1	0	0	0	11	0	0	3
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	0	4	1	5	2	12	0	0	7
Cleveland	1	0	------	0	16	1	3	1	33	0	0	33
Columbus	0	0	------	0	0	0	1	0	7	0	0	3
Indiana:												
Fort Wayne	0	0	------	0	0	0	1	0	1	2	0	0
Indianapolis	5	0	------	1	3	1	7	0	6	0	0	3
South Bend	0	0	------	0	0	0	0	0	1	0	0	0
Terre Haute	0	0	------	0	0	0	1	0	2	0	0	0
Illinois:												
Chicago	3	0	------	1	190	6	18	0	88	0	0	20
Springfield	0	0	------	1	0	0	1	0	0	0	0	0
Michigan:												
Detroit	12	0	------	0	152	1	15	0	63	0	1	26
Flint	0	0	------	0	5	0	5	0	8	0	0	1
Grand Rapids	0	0	------	0	5	0	2	0	4	0	0	0
Wisconsin:												
Kenosha	0	0	------	0	15	0	0	0	0	0	0	2
Milwaukee	1	0	------	0	14	1	1	0	63	0	0	2
Racine	0	0	------	0	1	0	0	0	4	0	0	6
Superior	0	0	------	0	7	0	0	0	2	0	0	3
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	0	0	2	0	6	0	0	0
Minneapolis	1	0	------	1	5	1	5	0	15	0	0	6
St. Paul	0	0	------	0	3	0	2	0	0	0	0	6
Missouri:												
Kansas City	1	0	------	1	15	1	8	0	9	0	0	4
St. Joseph	0	0	------	0	0	0	0	0	0	0	1	0
St. Louis	0	0	1	0	7	3	10	0	12	0	0	7

City reports for week ended June 16, 1945—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	1	------	0	1	0	0	0	0	0	0	0
Nebraska:												
Omaha	2	0	------	0	2	0	1	0	10	0	0	0
Kansas:												
Topeka	1	0	------	0	0	0	0	0	5	0	0	0
Wichita	1	0	------	0	0	0	2	0	7	0	0	0
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	1	0	1	0	0	0	0	0
Maryland:												
Baltimore	9	0	1	2	9	2	5	0	39	0	0	59
Cumberland	0	0	------	0	0	0	0	0	1	0	0	1
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	2	1	5	0	25	0	0	11
Virginia:												
Lynchburg	0	0	------	0	2	0	0	0	3	0	0	0
Richmond	0	0	------	0	2	2	0	0	6	0	0	0
Roanoke	0	0	------	0	0	0	0	0	0	0	1	0
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	0	0	0	4
Wheeling	1	0	------	0	3	2	0	0	0	0	1	0
North Carolina:												
Raleigh	0	0	------	0	2	0	3	0	1	0	0	5
Wilmington	0	0	------	0	6	0	2	0	1	0	0	12
Winston-Salem	0	0	------	0	1	0	1	0	5	0	0	11
South Carolina:												
Charleston	0	0	------	0	0	0	1	0	0	0	0	0
Georgia:												
Atlanta	0	0	------	0	0	0	2	1	0	0	0	4
Brunswick	0	0	------	0	0	0	1	0	0	0	0	1
Savannah	1	0	------	0	0	0	0	0	2	0	0	1
Florida:												
Tampa	0	0	------	0	1	1	1	0	2	0	1	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	2	0	17	3	4	1	1	0	0	4
Nashville	0	1	------	1	0	0	1	0	2	0	0	0
Alabama:												
Birmingham	0	0	1	0	1	0	1	5	2	0	0	0
Mobile	0	0	------	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	1	0	------	0	3	0	1	0	2	0	0	0
Louisiana:												
New Orleans	1	0	1	0	7	1	6	0	9	0	2	4
Texas:												
Dallas	3	0	------	0	4	0	0	0	1	0	0	1
Galveston	0	0	------	0	0	0	0	1	0	0	0	0
Houston	1	0	------	1	4	1	3	7	2	0	0	0
San Antonio	1	0	1	0	0	0	8	2	1	0	0	4
MOUNTAIN												
Montana:												
Billings	0	0	------	0	1	0	0	0	1	0	0	0
Great Falls	0	0	------	0	0	0	0	0	1	0	0	0
Helena	0	0	------	0	2	0	0	0	2	0	0	0
Missoula	0	0	------	0	0	0	0	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	0	0	1	0	0	0	6	0	6	0	0	2
Pueblo	0	0	------	0	0	0	0	0	0	0	0	3
Utah:												
Salt Lake City	0	0	------	0	49	1	0	0	1	0	0	5
PACIFIC												
Washington:												
Seattle	1	0	------	0	26	0	1	0	14	0	1	2
Spokane	1	0	1	0	1	0	4	0	3	0	0	0
Takoma	0	0	------	0	41	0	0	0	1	0	0	2

City reports for week ended June 16, 1945—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC—continued												
California:												
Los Angeles	2	0	3	0	72	2	2	0	48	0	0	60
Sacramento	1	0	-----	0	18	0	0	0	4	0	0	2
San Francisco	5	0	-----	0	161	0	7	1	46	0	0	19
Total	76	4	18	12	1,665	48	255	32	1,100	2	11	641
Corresponding week, 1944	49	-----	22	4	2,424	-----	221	-----	854	0	13	382
Average, 1940–44	56	-----	33	[1] 11	[2] 3,776	-----	[1] 269	-----	817	0	21	1,039

[1] 3-year average, 1942–44. [2] 5-year median, 1940–44.

Dysentery, amebic.—Cases: New York, 3; Philadelphia, 1; Detroit, 2; Houston, 1.
Dysentery, bacillary.—Cases: New York, 15; Rochester, 1; Chicago, 1, Charleston, S. C., 6; Los Angeles, 2; San Francisco, 1.
Dysentery, unspecified.—Cases: San Antonio, 14.
Leprosy.—Cases: Los Angeles, 1.
Rocky Mountain spotted fever.—Cases: Baltimore, 1; Atlanta, 2.
Typhus fever, endemic.—Cases: Atlanta, 1; Birmingham, 1; New Orleans, 1; Galveston, 2; Houston, 2; San Antonio 2

Rates (annual basis) per 100,000 population, by geographic groups, for the 89 cities in the preceding table (estimated population, 1943, 84,303,600)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	2.6	2.6	2.6	0.0	557	7.8	57.5	2.6	327	0.0	2.6	144
Middle Atlantic	8.8	0.5	2.3	1.4	264	6.0	35.6	4.2	178	0.0	0.9	111
East North Central	13.4	0.0	0.0	1.8	251	6.7	36.5	1.8	179	1.2	0.6	64
West North Central	11.9	2.0	2.0	4.0	66	9.9	59.7	0.0	127	0.0	2.0	46
South Atlantic	18.0	0.0	1.6	3.3	47	13.1	36.0	1.6	139	0.0	4.9	178
East South Central	0.0	6.0	17.7	6.0	106	17.7	35.4	41.3	30	0.0	0.0	24
West South Central	21.1	0.0	6.0	3.0	54	6.0	54.4	30.2	45	0.0	6.0	27
Mountain	0.0	0.0	7.9	0.0	413	7.9	47.7	0.0	87	0.0	0.0	79
Pacific	15.8	0.0	6.3	0.0	504	3.2	22.1	1.6	183	0.0	1.6	134
Total	11.6	0.6	2.7	1.8	254	7.3	38.9	4.9	168	0.3	1.7	98

PLAGUE INFECTION IN BANNOCK COUNTY, IDAHO

Plague infection has been reported proved in a pool of 265 fleas, 7 ticks, and 8 lice from 3 marmots taken on June 1, 1945, from a location 1 mile east of State Highway No. 34 at a point 4 miles south of Grace, Bannock County, Idaho, and in a pool of 16 fleas from 28 mice, *Peromyscus* sp., taken June 2 from the same location.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Influenza.—According to information dated June 26, 1945, 1,513 cases of influenza had occurred on the island of Oahu, T. H., during the preceding 3 weeks. The virus was stated to be Type B according to Army laboratory tests and the disease was said to be of mild type, with few complications. For the month of June 1944, 44 cases of influenza were reported for all of Hawaii Territory with no cases being reported on the island of Oahu.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 2, 1945.—During the week ended June 2, 1945, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		10	1	264	393	47	20	67	130	932
Diphtheria		6	1	32	2	2				43
Dysentery, bacillary				5					3	8
German measles		5		5	111	3	1	29	32	186
Influenza		13			83	1			8	105
Measles		8		153	219	32	43	150	267	872
Meningitis, meningococcus				2		1	1		2	6
Mumps		7		144	131	61	37	126	14	520
Poliomyelitis				1		1				2
Scarlet fever		6	11	88	76	8	9	11	9	218
Tuberculosis (all forms)		2	8	51	34	29		52	41	217
Typhoid and paratyphoid fever		1		4				2		7
Undulant fever				8	4					12
Venereal diseases:										
Gonorrhea		19	32	75	111	35	21	37	79	409
Syphilis	3	36	10	108	83	7	5	12	31	295
Whooping cough		3	1	109	30	8	1	23	3	178

CUBA

Provinces—Notifiable diseases—4 weeks ended May 19, 1945.—During the 4 weeks ended May 19, 1945, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	2	2	3		5	13
Chickenpox		23		4	1	26	54
Diphtheria		14	2			1	17
Malaria				2	1	11	14
Measles		4			1	2	7
Poliomyelitis				1			1
Rabies						1	1
Tuberculosis	16	30	21	20	4	25	116
Typhoid fever	10	110	21	43	22	39	245
Undulant fever	1	1					2

[1] Includes the city of Habana.

FINLAND

Notifiable diseases—April 1945.—During the month of April 1945, cases of certain notifiable diseases were reported in Finland as follows.

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	23	Mumps	697
Chickenpox	395	Paratyphoid fever	244
Conjunctivitis	19	Pneumonia	2,680
Diphtheria	1,268	Poliomyelitis	9
Dysentery, unspecified	11	Puerperal fever	29
Gastroenteritis	2,209	Rheumatic fever	262
Gonorrhea	1,859	Scabies	3,583
Hepatitis, epidemic	611	Scarlet fever	394
Influenza	1,187	Syphilis	399
Laryngitis	40	Typhoid fever	37
Malaria	18	Vincent's angina	21
Measles	210	Whooping cough	2,998

NEW ZEALAND

Notifiable diseases—4 weeks ended May 19, 1945.—During the 4 weeks ended May 19, 1945, certain notifiable diseases were reported in New Zealand as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	5	3	Poliomyelitis	2	1
Diphtheria	148	6	Puerperal fever	5	2
Dysentery, bacillary	26	----	Scarlet fever	612	1
Erysipelas	19	----	Tetanus	2	1
Food poisoning	12	----	Trachoma	1	----
Influenza	1	2	Tuberculosis (all forms)	133	42
Malaria	13	----	Typhoid fever	5	2
Ophthalmia neonatorum	1	----			

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Cholera

China—Chungking.—A report dated June 21, 1945, stated that cholera was spreading in Chungking, where more than 2,000 cases had occurred, and during the preceding 10 days more than 200 persons had died of the disease. A telegraphic report dated June 15, 1945, stated that 1 case of cholera had been reported in Pei Shi Yu, and 1 case in Shin Chiao, Szechwan Province. A report dated June 18, 1945, stated that 1 case with 1 death had occurred in Hsin Kai Shik, Pa Hsien, Szechwan Province, and 1 case in Hsiao Lung Ken, Chungking. Contributing factors were said to be inadequate supply of drinking water and influx of refugees who are living in Chungking under insanitary conditions. Precautionary measures are being taken.

Plague

Canada—Alberta Province.—On June 9, 1945, plague-infection was reported in fleas taken from ground squirrels found on the east side of Lake Newell, Province of Alberta, Canada.

China—Foochow.—According to a report dated June 11, 1945, more than 30 cases of bubonic plague have occurred in Foochow, China, since May 25, 1945. Measures are now being taken to combat the disease.

Madagascar.—For the period May 1–10, 1945, 4 cases of plague were reported in Madagascar.

Morocco (French).—For the period June 1–10, 1945, 81 cases of plague were reported in French Morocco.

Smallpox

British East Africa—Tanganyika.—Smallpox has been reported in Tanganyika as follows: Weeks ended—May 12, 1945, 1 case in Dar-Es-Salaam; May 19, 1945, 78 cases with 2 deaths in the whole territory.

Nigeria.—Smallpox has been reported in Nigeria as follows: Weeks ended—April 14, 1945, 185 cases, 27 deaths, April 21, 1945, 198 cases, 50 deaths, including 1 case in Port Harcourt.

Sierra Leone.—Smallpox has been reported in Sierra Leone, as follows: Weeks ended—April 14, 1945, 2 cases, 1 death, in Freetown, May 5, 1945, 10 cases.

Typhus Fever

British East Africa—Kenya—Mombasa.—For the week ended May 26, 1945, 8 cases of typhus fever were reported in Mombasa, Kenya, British East Africa.

Chile.—For the 4 weeks ended April 21, 1945, 63 cases of typhus fever with 3 deaths were reported in Chile. Provinces reporting the highest incidence are as follows: Concepcion, 13 cases; Chiloe, 10 cases, 2 deaths; Tarapaca, 8 cases; Valparaiso, 8 cases.

France—Lyon.—For the month of May 1945, 5 cases of typhus fever were reported in Lyon, France, among deportees recently repatriated from German concentration camps.

Iran.—For the period January 28 to February 17, 1945, 150 cases of typhus fever were reported in Iran, including 14 cases reported in Tehran.

Morocco (French).—For the period June 1–10, 1945, 308 cases of typhus fever were reported in French Morocco, including 28 cases reported in Casablanca and 8 cases in Rabat.

Peru.—For the month of April 1945, 56 cases of typhus fever were reported in Peru, including 36 cases in Cuzco Department and 10 cases in Ancash Department.

Sierra Leone—Freetown.—During the week ended April 21, 1945, 1 case of typhus fever was reported in Freetown, Sierra Leone.

Turkey.—For the week ended June 16, 1945, 45 cases of typhus fever were reported in Turkey, including 1 case in Antalya, 2 cases in Istanbul, and 2 cases in Zonguldak.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF PUBLIC HEALTH METHODS

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